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(58) Field of search

**A4F**

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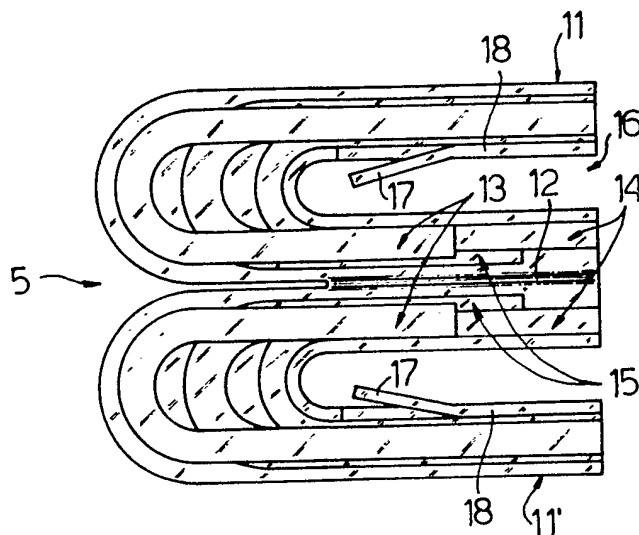
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(54) **Connector for connecting a  
windscreen wiper blade to wiper  
arms of differing dimensions**

(57) A connector (5) for connecting a windscreen wiper blade to any one of a plurality of wiper arms differing in dimension comprises a body, which may be formed from plastics material in two parts (11, 11') interconnected by hinge portion (12), having channels (13, 14, 15) formed therein for accommodating the ends of the wiper arms and preventing relative displacement between arm and connector.



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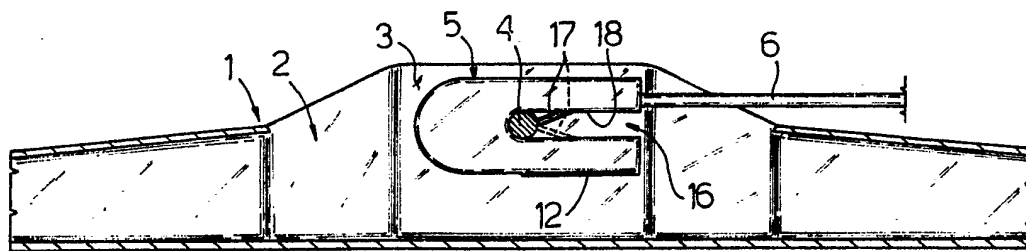


Fig. 1

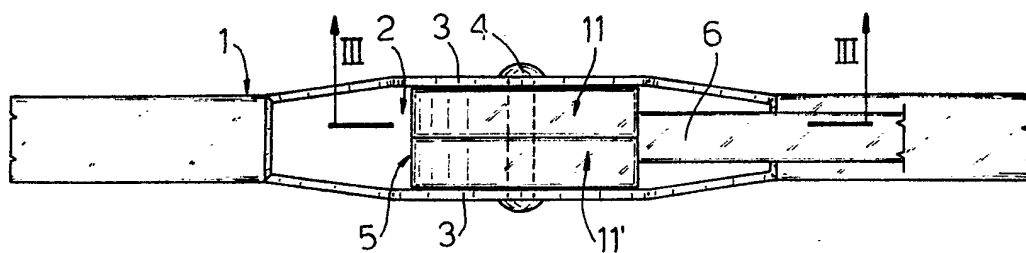


Fig. 2

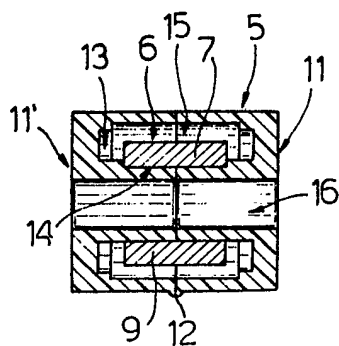


Fig. 5

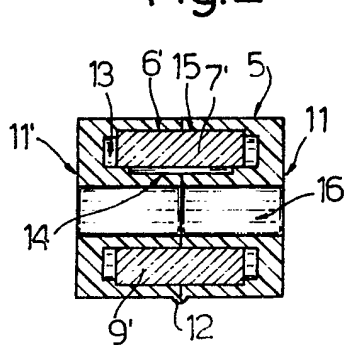


Fig. 10

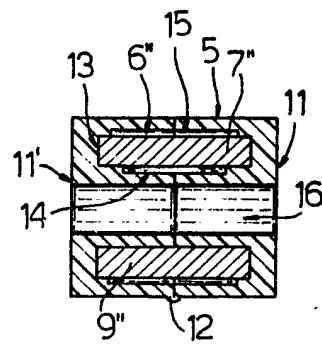


Fig. 12

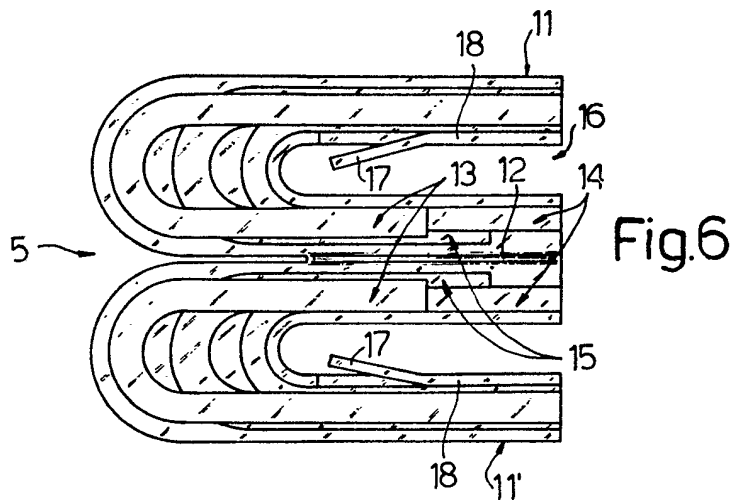


Fig. 6

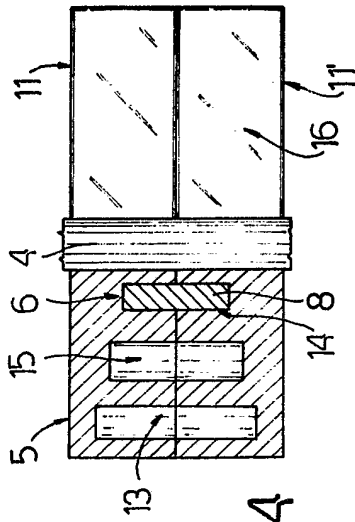


Fig. 4

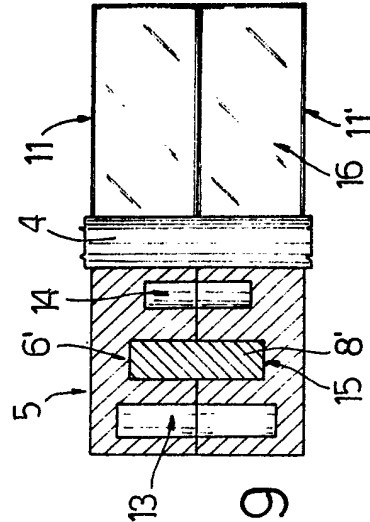


Fig. 9

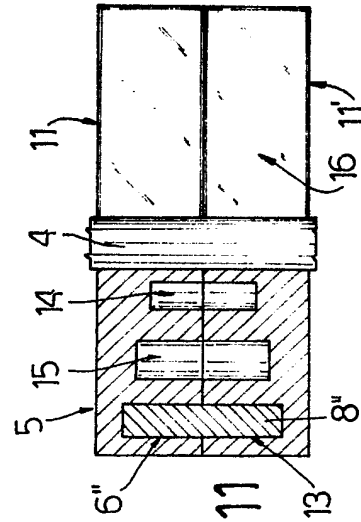


Fig. 11

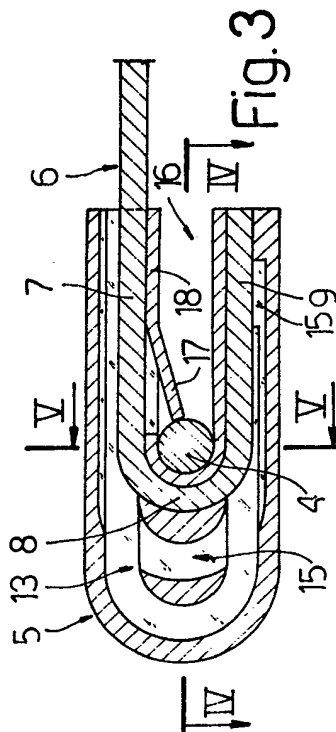


Fig. 3

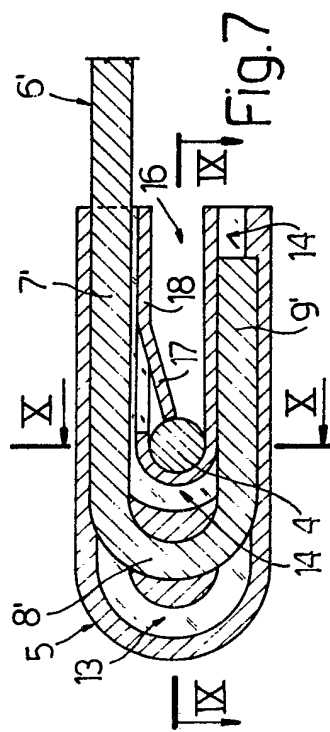


Fig. 7

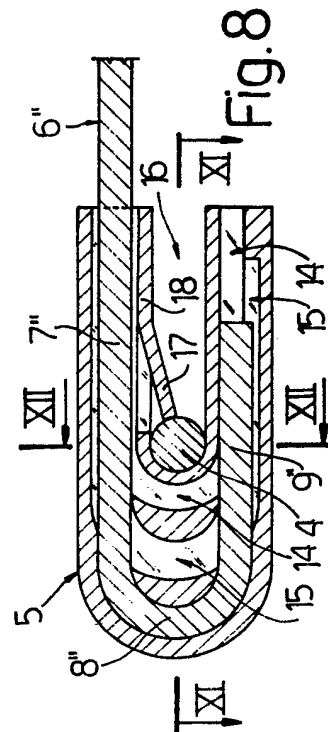


Fig. 8

## SPECIFICATION

**An intermediate connection element for a  
windscreen wiper blade and an associated  
operating arm**

The present invention relates to an intermediate connection element for a windscreen wiper blade and an associated operating arm.

- As is known, such operating arms have different dimensions so that currently different intermediate connection elements for each specific operating arm to which a windscreen wiper blade must be connected are provided; this means that, in the case of the packaging of currently marketed windscreen wiper blades, together which each blade or pair of blades there is a plurality of such intermediate connection elements which must then be discarded by the user in that only one is utilised.

- The object of the present invention is that of providing an intermediate connection element for a windscreen wiper blade and associated operating arm which permits the above indicated disadvantages to be overcome, that is to say, which can be utilised for connection to operating arms of different dimensions so as to reduce the number of such intermediate connection elements sold in packages with windscreen wiper blades, thereby obtaining an economic cost advantage and greater simplicity of selection for the user.

- According to the present invention there is provided an intermediate connection element for connecting a windscreen wiper blade and an associated operating arm, including a plurality of alternative at least partial abutment surfaces for operating arms of different dimensions, characterised by the fact that the said surface also provide a fixing against relative displacement between the said arms and the said element.

- For a better understanding of the present invention a particular embodiment will now be described, purely by way of non-limitative example, with reference to the attached drawings, in which:

- Figure 1* is a partially sectioned side view of a windscreen wiper blade with an intermediate connection element according to the present invention fitted thereto;

*Figure 2* is a view from above of the windscreen wiper blade portion of *Fig. 1*;

- Figure 3* is a sectioned view taken on the line III-III of the intermediate connection element of *Fig. 2*;

- Figures 4 and 5* are section views taken on the lines IV-IV and V-V respectively of the intermediate connection element of *Fig. 3*;

- Figure 6* is a side view of the intermediate connection element of *Fig. 1*, in an open position;

- Figures 7 and 8* are sectioned views of the intermediate connection element of the present invention, similar to *Fig. 3*, but con-

nected to operating arms of different dimensions;

- Figures 9 and 10* are sectioned views taken on the lines IX-IX and X-X respectively of the intermediate connection element of *Fig. 7*; and

- Figures 11 and 12* are sectioned views taken on the lines XI-XI and XII-XII respectively of the intermediate connection element of *Fig. 8*.

- With reference to *Figs. 1 and 2*, the reference numeral 1 indicates a central portion of a windscreen wiper blade having a central aperture 2 defined by two side walls 3 between which there is normally fixed transversely a pin 4 to which is secured, in the manner now to be described, an intermediate element 5 formed according to the present invention, for connection to an operating arm 6. With reference to *Fig. 3*, this arm 6 has a curved terminal portion, in detail it has an upper rectilinear section 7, an intermediate curved section 8 and a lower rectilinear section 9.

- The intermediate element 5, as is also shown in *Fig. 6*, has two constituent parts 11 and 11' which are mirror images of one another, conveniently made of plastics material by injection moulding, and joined by means of a thin connecting section 12 which also constitutes a folding hinge between the two constituent parts 11 and 11' when these are closed about the operating arm 6. In the interior of the constituent parts 11 and 11' there are moulded three channels 13, 14 and 15 for both the parts, partially superimposed over one another and having different dimensions of width and height and being differently positioned. Each of these channels can receive a respective operating arm 6, 6' or 6'' in that it has the same form and the same dimensions of height and width; in detail, the operating arm 6 can be housed in the channel 14 as can be seen in *Fig. 3*. The other channels 13 and 15 can receive operating arms of different dimension; in particular, the channel 13 can receive an operating arm 6' (*Fig. 7*) having a greater thickness and a greater width than the arm 6 (as can be seen in *Figs. 9 and 10*).

- In the channel 13, on the other hand, there is housed an operating arm 6'' (*Fig. 8*) which, as can be seen also in *Figs. 10 and 11*, has a greater width than the arms 6 and 6' and an intermediate thickness.

- As can be seen in *Fig. 6*, the channel 13 in the lower rectilinear section of the housing portion 9'' of the arm 6'' terminates a distance from the end of the element 5 which is greater than that at which the housing channel 15 of the lower rectilinear section 9' for the operating arm 6' terminates.

- As is clearly visible in *Figs. 4, 9 and 11* the curved intermediate section 8, 8' and 8'' of the operating arms 6, 6' and 6'' lie com-

pletely for the whole of their surface within the intermediate element 5 so that they are secured and prevented from relative displacements with respect to the element 5. The upper rectilinear sections 7, 7' and 7'' and the lower rectilinear sections 9, 9' and 9'' of the arms 6, 6' and 6'' as can be seen in Figs. 5, 10 and 12, engage only partially on the inner surface of the element 5, nevertheless always guaranteeing a sufficient contact for stable positioning.

The assembly of the intermediate element 5 of the present invention takes place in the following manner.

In dependence on the operating arm 6, 6' or 6'' present on the vehicle the user arranges this arm in the associated channels 13, 14 or 15 of the intermediate element 5 in its open configuration as is shown in Fig. 6. Then the two constituent parts 11, 11' are closed one onto the other pivoting about the connecting section 12. The windscreen wiper blade is thereupon coupled to the element 5 by insertion of its pin 4 into a cavity 16 of the element 5 such that this pin is inserted at the bottom of the cavity 16 and correspondingly a resilient tongue 16 which projects from a wall 18 defining one side of the cavity 16 for each of the parts 11 and 11' and projecting into the cavity itself, snaps resiliently onto the surface of this pin 14 locking it in this fixed position at the bottom of the cavity 16 as can be seen in Figs. 1, 3, 7 and 8, such that the windscreen wiper blade can turn about the axis of the pin 4 with respect to this element 5.

The overall width of the two constituent parts 11 and 11' of the element 5 is substantially equal to the width of the central aperture 2 in the corresponding housing zone for the element 5 so that these two parts 11 and 11' remain held closed together therefore fixing the operating arm 6, or 6' or 6'' to these without any possibility of relative movement.

The intermediate connection element 5 formed according to the present invention offers, therefore, the advantage that coupling of a windscreen wiper blade 1 to operating arms 6 or 6' or 6'' of different dimensions can be made with a single element in a very simple and rapid manner, which facilitates assembly for the user who does not have to choose between specific intermediate connection elements made for each type of arm, and with economic and cost advantages of a reduced number of component parts for the packaging and sale of windscreen wiper blades. The construction of such intermediate element 5 in two constituent parts 11 and 11' which are mirror images of one another, which open along a median plane of the element 5, further allows a very simple and therefore economic production by moulding.

Finally, it is clear that the described embodiments of the intermediate connection ele-

ment 5 formed according to the present invention can be modified and varied without departing from the scope of the invention itself. For example, a second resilient tongue 17 (indicated in broken outline in Fig. 1) could also be provided.

## CLAIMS

1. An intermediate connection element for connecting a windscreen wiper blade and associated operating arm including a plurality of alternative at least partial contact surfaces for operating arms of different dimensions, characterised by the fact that the said surfaces also cause a fixing of the said arms and the said element against relative displacements.

2. An element according to Claim 1, characterised by the fact that the said fixing surfaces define at least partial channels, at least partially enclosing the said arms.

3. An element according to Claim 2, characterised by the fact that the said fixing surfaces enclose a curved portion of the said arms.

4. An element according to any preceding Claim, characterised by the fact that it is formed in at least two parts which can be closed over the said arms.

5. An element according to Claim 4, characterised by the fact that the said channels of different dimensions for housing the said arms are formed in the said two parts.

6. An element according to Claim 4 or Claim 5, characterised by the fact that the said two parts are formed by moulding, with a connecting section along a fold line for closing the said parts.

7. An element according to any of Claims from 4 to 6 characterised by the fact that the said two parts when closed have a width substantially equal to the width of a central slot of the blade in which the said element is inserted.

8. An element according to any preceding Claim, characterised by the fact that it has a cavity for the insertion of a pin belonging to the said blade and at least one resilient tongue projecting into the said cavity to snap engage the said element to the said pin lodged at the bottom of the cavity.

9. An element according to any preceding Claim, characterised by the fact that it is made of plastics material.

10. An intermediate connection element for connecting a windscreen wiper blade to an associated operating arm, as described with reference to the attached drawings.